MERINGIUM MINIMUM
RECOGNITION OF MERINGIUM MINIMUM AND ITS REDISCOVERY ON THE PORT HILLS

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MERINGIUM Presl

The classification of the Hymenophyllaceae has been controversial ever since Copeland (1938, 1947) re-introduced the concept of many small genera within the family to a botanical world that has been used, for generations, to referring species to only Hymenophyllum or Trichomanes. Marguerite Crookes (1952, 1963), in her revisions of Dobbie's 'N.Z. Ferns', accepted Copeland's treatment in its entirety, distributing 26 spp of N.Z. Hymenophyllaceae amongst no less than 12 genera. Allan (1961), on the other hand, retained the attribution of each species to either Hymenophyllum or Trichomanes. Though he recognised Copeland's genera only as subgenera, nevertheless by implication he acknowledged their practicality, since he provided one key to separate the genera and subgenera, and independent keys to the species under each subgenus.

Three N.Z. species, bivalve Forster f., minimum A. Richard, and multifidum Forst. f., are classified under Meringium. Fortunately we can ignore here the question as to whether or not, as genus or subgenus, Meringium is in fact a natural group; fortunately because there is strong but incomplete evidence (Braithwaite 1975, Lovis unpub.) indicating that it is not. In particular is this true of M. bivalve, which does not concern us further here, since it has never been claimed to exist on the Port Hills. Meringium is closest to Hymenophyllum, sensu stricto, also represented in N.Z. by three species; cupressiforme Labillardière (see Parris and Croxall 1972), peltatum (Poiret) Desvaux, and revolutum Colenso. These two groups, are very easily confused. Meringium differs only in the two

flaps of the indusium (=involucre) being more joined at the base, and in the receptacle, when mature, extending beyond the limits of the involucre. (A further distinction in the cell walls of the lamina is not well developed in N.Z. species of Meringium). In both genera the margin of the lamina segments is toothed (which distinguishes them from Mecodium Copeland, to which most N.Z. 'hymenophyllums' belong), while the edge of the indusial flap is variously entire or toothed in different species of Hymenophyllum s.s. and Meringium.

RECOGNITION OF MERINGIUM MINIMUM

Meringium minimum (A. Richard) Copeland, one of a group of diminutive Southern Hemisphere species, is now recognised as being endemic to New Zealand, being adequately distinct from all of caespitosum Gaudichaud-Beaupré of the Falkland Islands and Fuegia, pumilum Moore of New South Wales, and moorei Baker of Lord Howe Island. (Hooker 1847, Brownlie 1960, Tindale 1963).

This minute species, which is small enough to be reaily overlooked when growing amongst bryophytes, is distinguished by its solitary terminal sorus, which is large in comparison with the frond that bears it, and is unequivocably identifiable by the presence or spines borne not only on the edge, but also on the surface of the indusial flaps, the latter feature being a characteristic unknown in any other New Zealand species of filmy fern.

The much commoner species Meringium multifidum, even when depauperate, is readily distiguished from M. minimum, so long as it is fertile, because the frond bears several or many sori, laterally placed, in contrast to the terminal and solitary sorus of M. minimum. Moreover, in M. multifidum, the edge of the indusium is usually entire, and if not, then never more than bluntly denticulate, in contrast to that of minimum with its conspicuous lanceolate teeth or spines.

Only when both diminutive and sterile can *multifidum* be confused with *minimum*.

Although *Meringium minimum* is readily distinguished from typical forms of *Hymenophyllum cupressiforme* and *H. revolutum* by characters of frond size, frond dissection and soral distribution, it can more easily be confused with sparingly fertile and diminutive forms of these two species, for both have a toothed margin to the lamina and toothed indusium lips. But neither possesses the spines on the back of the indusium valves diagnostic of *M. minimum*.

These facts have long since been recognised and clearly stated. Thus Hooker (1847, p.104) observed that "the curiously spinulose valves of the involucre afford an excellent specific character", and later (Hooker 1855, p.12) analysed the problem succinctly and simply, writing of *minimum* "... closely allied to *H. Tunbridgense* and *H. multifidum*, differing from the former in the spinulose back of the valves of the involucre, and from the latter in this latter character and their serrate lips". Nevertheless, Cheeseman (1906, p.939; 1925, p.13) went so far as to comment " A much misunderstood species; most collectors confusing it with small forms of *H. Tunbridgense*, from which, however, it is readily distinguished by the uniformly solitary and terminal sori, the indusium of which is spinulose on the back as well as on the margins".

Although Cheesman (loc.cit.) stated firmly "Sori never more than one to a frond", in contradiction Allan gives "sori us. (= usually) solitary". In writing thus, Allan may have been following Holloway (1923, p.594), who wrote "sori .... are usually borne singly..., but occasionally fronds bear two sori". We believe that Allan's statement could mislead; preferable is Crookes (loc.cit.) "Sori rarely more than one to a frond". Neither of us has yet seen an example with more than a solitary terminal sorus.

Meringium minimum has not been well-served by illustrators, even though Vauthier's enlargement of the upper portion of a frond in the atlas of figures accompanying Richard's original description (Richard 1832, plate 15, fig.2B) is superb. This publication is, however, to put it mildly, not readily available. (The Royal Society's copy is in the Special Collections Room of the University Library.) Field (1890, plate XVI: 5) shows a small form of H revolutum (his figure of 'Trichomanes armstrongii (plate V:1) more nearly resembles minimum!). The illustration published by Dobbie (1931, p.63), which is of a specimen from Atiamuri , in the centre of the North Island, N. of Taupo, presents an intriguing problem, for neither Cheesman nor Allan admit the existence of M. minimum in the North Island. More recently Chinnock (in Heath and Chinnock 1974, p.30) states that it is present in the North Island, but is there "known only from the Wellington coast and in the Wairarapa". However, there is in existence (CHR 293691) a specimen of M. minimum from near Atiamuri, collected by K.W.Allison in September 1929, which clearly shows the diagnostic spines on the backs of the indusium valves. This collection is similar in appearance to Dobbie's specimen, which does therefore appear to represent true minimum from a station far north (ca.150 miles) of the limit of its recognised range. Nevertheless, the Atiamuri plant is a lax rather atypical form of M. minimum, and furthermore neither Dobbie's photographs nor the drawing of a magnified frond added by Crookes (1952) show the diagnostic features of the species clearly, if at all. The photograph presented in Holloway (loc.cit., plate 67) is unquestionably typical M. minimum and of superior quality to Dobbie's, but even here the spines on the back of the involucre are scarcely discernable. There remains the two modern illustrations. A number of the illustrations of filmy ferns presented by Heath and Chinnock (loc.cit.) are not very sucessful, failing to capture the 'feel' or 'look' of the plants they attempt to represent. This is true of

their figure of M. minimum (p.30, fig.71), but the enlargement does show the spines on the involucre. Hugh Wilson (1978, p.270, fig.513) more nearly captures the appearance of M. minimum, but his enlargement is of a sterile frond! However, Hugh has remedied this shortcoming in his book on the flora of Stewart Island.

MERINGIUM MINIMUM ON THE PORT HILLS

Potts (1882, p.249) recorded Meringium minimum from "Rapaki, Lyttelton Harbour". Both Laing (1919, p.347) and John Thompson (1979, p.25) noted this old record, but Cockayne (1915) and Wall (1918, 1953) seem to have overlooked it. This is curious, for they were both clearly aware of other records for Lyttelton Harbour, also for species of filmy ferns (e.g. dilatatum, rarum), made by Potts in the same book (in one case, on a facing page).

No record for Meringium minimum on the Port Hills other than that of Potts exists, but since Colenso's Hymenophyllum pygmaeum is demonstrably at least principally based on material of M. minimum (Lovis, in prep.), the record he cited for "hills round Lyttelton harbour" (Colenso 1881, p.376, cf. Allan 1961, p.31; also Field 1890, p.66 "on the Port Hills, between Lyttelton and Christchurch") probably refers to M. minimum. It is unknown who sent this collection to Colenso; it may well have been Potts, but this suggestion is no more than guesswork on our part.

On 2nd November 1980 one of us (JDL), when in the company of Patrick Brownsey of the National Museum, found Meringium minimum in very small quantity, but fertile, at eye-level in the well-known locality for Cotula nana Lloyd (see Lloyd 1972, p.340 et seq.), below crags overlooking Lyttelton on Mt. Pleasant. Later, in October 1981, we together established the presence elsewhere on the crags in this same locality of a larger and much denser patch of M. minimum, growing at a higher level, but still just

accessible, so that a tiny fragment could be obtained as a voucher to confirm the identification.

We also satisfied ourselves, since with the aid of a monocular sori could be seen, of the existence of a yet larger but even less accessible patch, higher still, at the other end of the same rock slab.

Only a week later, revisiting a locality for Mecodium sanguinolentum on Cass Peak, MD, was surprised to find Meringium minimum growing with it in some abundance! In this second locality, only this one very restricted station has been detected.

There is no doubt in our minds that on both Mt. Pleasant and Cass Peak, the status of Meringium minimum is that of a relict. The reason why this species has not previously been detected on Mt. Pleasant, a well-botanised locality, can only be the known propensity of botanists to overlook the unexpected, unless the unexpected for some reason catches their eye, and M. minimum is very inconspicuous.

There remains the question of the precise locality and habitat at Rapaki where Potts found Meringium minimum. John Thompson (loc. cit., p. 25) states that two attempts to refind M. minimum above Rapaki were unsuccessful. However, the elevation at which Potts found M. minimum is not known. He states only (loc.cit., p.249) "Habitat. On roots and stumps of trees. Cook's Strait; Rapaki, Lyttelton Harbour; Okarito, Westland". In the two Port Hills localities known to us, the fern occurs only on damp vertical mossy rock slabs. This species is very tolerant of salt spray, at least in regions of high rainfall. It occurs literally at sea-level in Westland, and a shaded shoreline location at Rapaki, being south-facing, is not inconceivable. However, since Potts refers elsewhere (loc.cit., p.61) to "some of the dwarfer forms" of Mecodium rarum growing "near the top of the small patches of bush that dot the native reserve at

Ruapaki", it is evident that he did visit the higher slopes and it most probably was in this same vicinity that he saw M. minimum. A painting in the Akaroa Museum of Rapaki from Church Bay by J. Gibb, dated 1877, shows surprisingly little sign of bush on the slopes above, but isolated trees, no longer present today, are seen on the skyline. Even if the upper slopes above Rapaki were not so different, a centruy ago, as one might have supposed, even a small amount of further bush destruction may well have been sufficient to tilt the balance finally against a species surviving at the limits of its tolerance. Such must have been the fate of the M. rarum Potts knew above Rapaki, and, most probably of M. minimum as well, in this particular station.